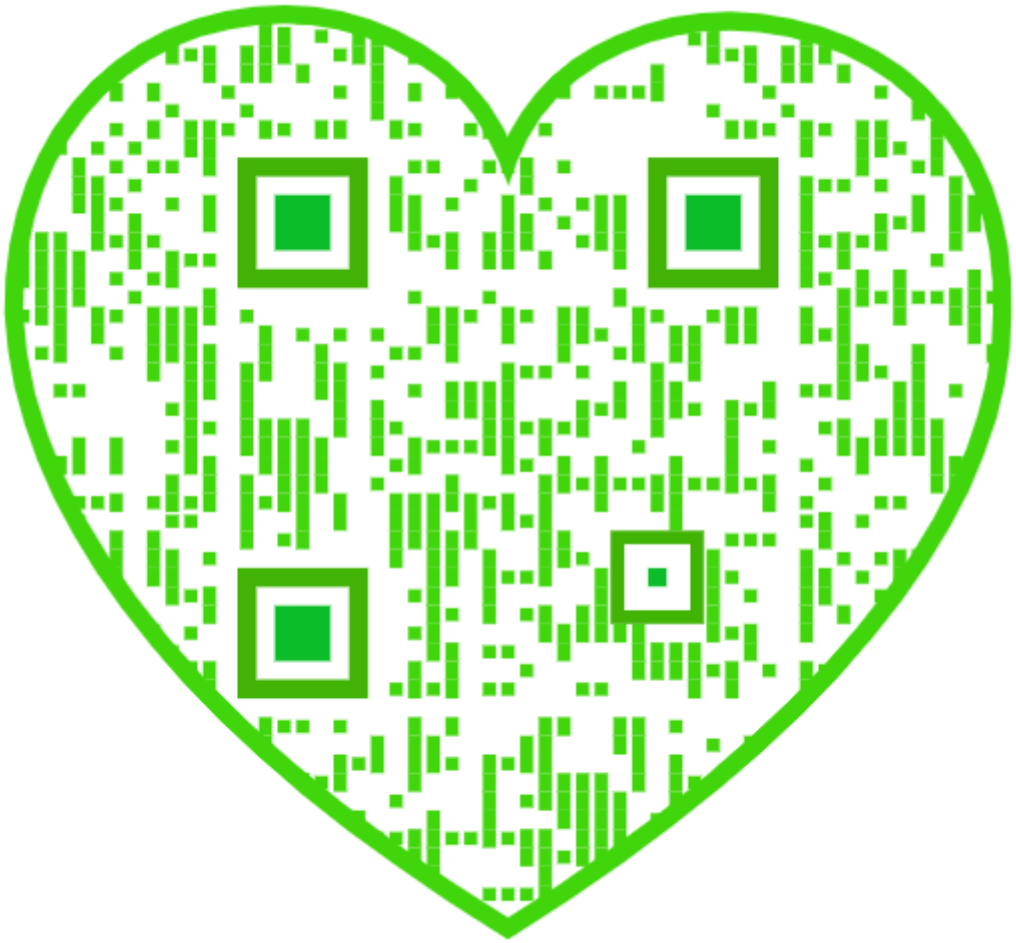

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THE CULTIVATION OF HEMP IN THE UNITED STATES.

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THE CULTIVATION OF HEMP IN THE UNITED STATES.

INTRODUCTION.

Hemp (*Cannabis sativa*) (see fig. 1) is an annual plant of the mulberry family, cultivated for the production of a soft bast fiber. This fiber, gray if dew-retted, or light yellow if water-retted, is also called hemp. In a strict sense the name "hemp" is correctly applied only to this plant and its fiber.

FIG 1.—Field of hemp in Kentucky at harvest time.

DISTRIBUTION.

Hemp is cultivated commercially for fiber production in Russia, Italy, Austria, Hungary, Germany, France, Belgium, Turkey, China, Japan, and the United States. Russia produces more for export than all the other countries.

Most of the hemp cultivated in this country, amounting to from 15,000 to 20,000 acres annually, is grown in the bluegrass region of Kentucky, of which Lexington is the center. About 600 acres are grown each year near Lincoln, Nebr., and an area of about the same size in the lower Sacramento Valley in California. During the past two years hemp has been grown successfully at Kouts and North Liberty, Ind., and at Hanover, Pa. It has also been grown experimentally in Wisconsin, Michigan, Minnesota, Iowa, and Arkansas.

CLIMATE.

Hemp requires about 110 days for its growth. It should have a rainfall of at least 10 inches during this period. It has not been grown commercially under irrigation. If the level of free water in the soil is within 5 to 10 feet from the surface, as is often the case in alluvial river-bottom lands, and the character of the soil is such that there is good capillary action to bring the water up, hemp will not suffer from drought, even should there be very little rainfall. Hemp is uninjured by light frosts. It may therefore be sown earlier than oats and harvested later than corn.

SOIL.

Hemp requires for its best development a rich, alluvial, or loamy soil not subject to severe drought, yet not of a swampy condition. It is not to be recommended for a light sandy soil, unless it follows a crop of clover or beans which has left a plentiful supply of nitrogenous fertilizer. The soil should also be well supplied with lime. Hemp will not grow well in an acid soil or on gumbo soils. Excellent crops have been obtained in Indiana during the past two seasons on peaty soils over marl.

The best fertilizer for the hemp crop is barnyard manure, and this should be applied to the previous crop or, at the latest, in the fall before sowing the hemp. Hemp may be introduced in any crop rotation, but it is best to have it follow peas, beans, or clover. It may follow corn or grain, providing these crops are well fertilized. A dense growth of hemp destroys nearly all weeds, and as it is a rather deep rooting plant and shades the soil it leaves the land in excellent condition for any crop which may follow.

SOWING.

Hemp seed should be sown at the rate of approximately 1 bushel per acre at about the time of sowing oats or as early as possible after the period of severe frosts. If possible the land should be plowed during the previous fall. Fall plowing is essential for success if a heavy sod or much vegetation is to be turned under. The soil should be harrowed at least once before seeding in order to settle the furrows.

The seed is sown broadcast by hand or by any good broadcast seeder set for seeds smaller than average grains of wheat. Good results are obtained with an end-gate seeder, a roller-press grain drill, or an ordinary toothed grain drill with the teeth removed and replaced by a board dragging on the ground below the feeding tubes. The seed falling on this board will be spread out evenly over the surface. The ordinary teeth cover the seed too deeply and crowd them in drills from 6 to 8 inches apart, so that the hemp does not grow as evenly as when it is spread over the entire surface. The seed may be covered by means of a light straight-toothed harrow. Drills similar to grain drills are made especially for sowing hemp seed and are largely used in Kentucky. These hemp-seed drills will be found most economical if large areas of hemp are to be sown or if hemp is to be raised year after year as a regular crop.

After seeding it is best to roll the land in order to have a smooth surface that will permit close cutting with machinery. After seeding the crop requires no further attention until harvesting.

HARVESTING.

Most of the hemp is now cut with self-rake reapers made especially for harvesting this crop. These machines require 2 men, or a man and a boy, and 4 horses for their operation and 1 man to keep the knives sharp. They cut a swath of about 5 feet, or about 5 or 6 acres per day. They leave the hemp stalks in gavels. After lying in the gavel for two or three days the stalks are either spread for retting, set in shocks without binding, or tied in bundles and set in shocks. When the harvest is late, or in the North, where there is little danger of hot dry weather that would "sunburn" the stalks, labor may be saved by spreading the hemp for retting immediately after cutting. If there is danger of hot dry weather after harvest the hemp should be cured in shocks. If it is to be stacked it must be bound in bundles before shocking. Stacking is not regarded as a necessary step in the preparation of hemp, but a greater weight and also a better quality of fiber are obtained from stalks which have been stacked. If the stacks are properly made they may be left almost indefinitely before retting. Three men will put up two stacks a day of about 8 tons each.

In Nebraska the hemp is cut with a mowing machine with a special homemade attachment, bending the stalks over in the same direction that the machine is cutting. One man with one span of horses will cut from 7 to 9 acres per day. The ordinary price paid there for cutting hemp is 50 cents per acre, including team and machine. The hemp is left on the ground as it falls until retted, when it is raked up with a horserake and hauled to the machine brake to be made into long tow.

RETTING.

Practically all of the hemp produced in Kentucky is dew-retted. It is spread on the ground, either from the gavel, shock, or stack, in rows with the stalks side by side and not more than two, or at most three, stalks in thickness, the butts all even and in one direction. It is left in this manner for from four to twelve weeks, or sometimes even longer, until the bark, including the fiber, separates readily from the woody portion of the stalk. The stalks are then raked up and set up in shocks to dry. As soon as dried they are ready for breaking.

BREAKING.

Much of the hemp produced in Kentucky is still broken by the old-fashioned hand brake, but this method is not recommended for introduction into any new locality because it requires a degree of skill that would be difficult to secure in laborers not accustomed to the work. Even in Kentucky the newer generation of laborers do not learn to break hemp, and this is one of the principal reasons that the industry is not carried on there to a greater extent. At least six different kinds of machines for breaking hemp and preparing the fiber have been in use during the past three years, and some of these prepare the fiber very much better than the hand brake.

At Havelock, Nebr., and at Courtland, Cal., there are power machines consisting essentially of a series of fluted rollers, somewhat like a jute softener, followed by large beating wheels, and these machines make long tow. They will handle a greater variety of different-sized hemp stalks in a satisfactory manner than the other machine brakes, but as the fiber is tangled instead of being straight it does not command as high a price as that produced by the hand brakes or by the other machine brakes mentioned.

YIELD.

The yield of hemp fiber ranges from 500 to 2,000 pounds to the acre. The general average yield under ordinary conditions is about 1,000 pounds to the acre. Yields are sometimes estimated at 150 pounds of fiber for each foot in height of the stalks, and also at 20 per cent of the weight of the dry, retted stalks, but estimates based on these factors alone may be misleading, for slender stalks yield much more fiber than coarse ones.

MARKET.

All of the hemp fiber produced in this country is used in American mills, and increasing quantities are being imported. It is used for making gray twines, "commercial twines," carpet warp, and ropes of small diameter.

The twenty-five mills in the United States using hemp fiber are mostly in or near Boston, New York, Philadelphia, Cincinnati, and San Francisco.

The average price paid during the last twenty years by local dealers to the farmers in Kentucky for the rough fiber tied up in handmade bales has been about 5 cents a pound. The prices during the same time for the fiber sorted, pressed in bales, and delivered at the mills as ordered have ranged from $130 to $175 per long ton.

The market is occasionally overstocked with low-grade hemp or tow, but there is little danger of an oversupply of good, strong, well-cleaned fiber.

PROFITS.

The following rough outline of expenses and returns may serve as a basis for estimating profits, keeping in mind that there may be considerable variation either way, due to local conditions:

Cost per acre.		*Returns per acre.*	
Seed, 1 bushel, at $4	$4.00	1,000 pounds of hemp fiber, at 5 cents	$50.00
Plowing	2.50		
Harrowing once	.50		
Sowing	.75		
Harrowing (omitted if special drill is used)	.50		
Rolling	.50		
Cutting	1.00		
Shocking	1.25		
Spreading for retting	1.50		
Picking up	1.50		
Breaking, 1,000 pounds, at 1½ cents per pound	15.00		
Baling and marketing	1.00		
Total cost per acre	30.00	Gross returns	50.00

Hemp can not be grown profitably in small isolated areas. Two hundred acres or more should be grown on one or more farms near together, so as to warrant the introduction of special machinery for drilling, harvesting, breaking, and baling, and also make it possible to ship the fiber in full car lots.

Before undertaking the cultivation of hemp on a commercial scale it is advisable to try some preliminary experiments with half an acre or less, to determine whether the local conditions are adapted to the crop.

Approved:

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., *March 28, 1910.*

[Cir. 57]